

# No evidence for an early seventeenth-century Indian sighting of Kepler's supernova (SN1604)

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Received 2012 May 8, accepted 2012 ??? ??  
Published online later

**Key words** supernovae: individual (SN1604) – history and philosophy of astronomy

In a recent paper in this journal Sule et al. (2011) argued that an early 17th-century Indian mural of the constellation Sagittarius with a dragon-headed tail indicated that the bright supernova of 1604 was also sighted by Indian astronomers. In this paper it will be shown that this identification is based on a misunderstanding of traditional Islamic astrological iconography and that the claim that the mural represents an early 17th-century Indian sighting of the supernova of 1604 has to be rejected.

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## 1 Introduction

Ancient records from various civilisations frequently note the occurrence of a ‘new star’ (comet, nova or supernova) in the heavens. Examples of such observations can be found in Babylonian, Greek/Roman, Far Eastern (China, Korea & Japan), Islamic and European sources. Of these cosmic events, the appearance of a supernova (the catastrophic collapse of the core of a massive star at the end of its evolution) is the rarest and the number of reliably observed stellar outbursts is small.

As all observed supernovae in our own galaxy (with the possible exception of the progenitor star of the radio/X-ray source Cas A, which may have been observed in August 1680 by John Flamsteed) occurred before the invention of the telescope (in 1608), each newly discovered record of such an event can be very useful for modern astronomers.

The last observed supernova in our own galaxy was first seen by two Italian astronomers on 9 October 1604 (New Style) in the constellation Ophiuchus, then also commonly known as Serpentarius (“The Snake-Bearer”). Now known as SN1604, V843 Oph or Kepler’s supernova, the new star attracted much attention among European astronomers and astrologers as it occurred in close proximity with the planets Mars, Jupiter and Saturn and some (among whom was Johannes Kepler) believed that the object was actually the result of this very close planetary configuration.

After its discovery, it continued to brighten and reached a peak magnitude of about  $-3.0$  in late October. It remained visible for 12 months until it was last seen on 8 October 1605 by Kepler (Kepler 1606; Baade 1943; Stephenson & Green 2002, chapter 5; Turatto et al. 2005).

## 2 The Sagittarius mural at the tomb of Madin Şāhib in Srinagar

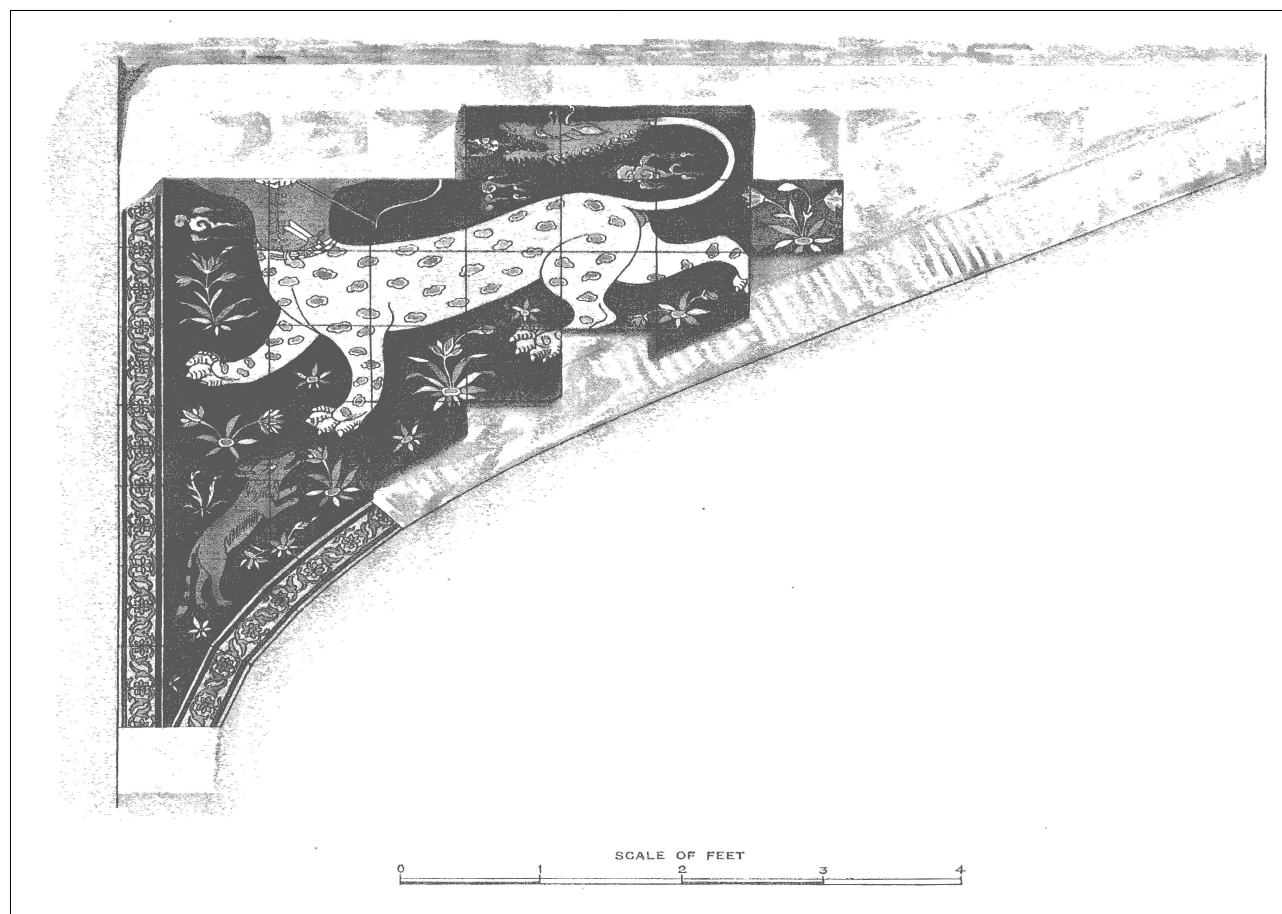
In a recent paper in this journal (Sule et al. 2011), the authors claim that an early 17th-century Indian glazed-tile mural (Fig. 1), formerly fixed in the left spandrel of the eastern entrance arch of the shrine of the Muslim saint Sayyid Muḥammad Madanī († 1445, locally known as “Madin Şāhib”) and adjacent to the Madin Şāhib mosque (completed in 1444) in the Zadibal suburb of Srinagar (Kashmir Valley, India), preserves a unique Indian pictorial record of the stellar outburst of 1604.

The mural was first described in situ<sup>1</sup> by the British architect and civil servant William Henry Nicholls (1865–1949), who visited the site in 1905. In his report, he wrote (Nicholls 1909):

“The tilework at the tomb of Madanī, near But Kadal in Srinagar, is made in squares with various brilliant colours in contact with each other on the same piece of tile. But its great interest lies in the subject which is represented in the southern half of the spandrel of the great archway in the east façade. It is hardly necessary to remind the reader that animal life was rarely represented in any form of decoration during Muhammadan rule in India. Akbar did not object to statues of horses and elephants; Jahāngīr allowed birds and butterflies to be carved, and Shah Jahān also had elephants set up, and at Lahore Fort he indulged in a panelled frieze representing elephant fights, and other

<sup>1</sup> According to Mustafizur Rahman (1989) and Bandey (2012) the Sagittarius mural was removed in the 1980s to prevent further degradation by weather and vandalism. Currently, it is on display in the Central Asian Museum (University of Kashmir, Srinagar). Other decorative tiles from the same site are preserved in the Shri Pratap Singh Museum (Srinagar) and in the Victoria and Albert Museum (London).

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**Fig. 1** Glazed-tile mural in the left spandrel of the eastern entrance arch of the tomb of Madin Şāhib in Zadibal (Srinagar, India) as drawn in 1905 by W.H. Nicholls. Plate LVII from Nicholls (1909).

subjects, all in tilework. Aurangzeb was a bigot, who not only would have none of animal life in any form on his buildings, but took a delight in smashing any instances of it which came to his notice whether on Hindu or Muhammadan buildings. It is fortunate indeed that he never chanced to see the tomb of Madanī when he was in Srinagar. His indignation would surely have been roused at finding, on the tomb of a Muhammadan saint, a representation of a beast with the body of a leopard, changing at the neck into the trunk of a human being, shooting apparently with a bow and arrow at its own tail, while a fox is quietly looking on among flowers and cloud-forms. These peculiar cloud-forms are common in Chinese and Persian art, and were frequently used by the Mughals—by Akbar in the Turkish Sultāna's house at Fathpur-Sīkrī, Jahāngīr at Sikandarāh, and Shah Jahān in the Dīwān-i-khāṣṣ at Delhi, to mention only a few instances. The principal beast in the picture is about four feet long, and is striking quite an heraldic attitude. The chest, shoulders, and head of the human being are unfortunately missing. The tail ends in a kind of dragon's head. As for the colours, the background is blue, the trunk of the man is red, the leopard's body is yellow with light green spots, the dragon's head and

the fox are reddish brown, and the flowers are of various colours. It is most probable that if this beast can be run to earth, and similar pictures found in the art of other countries, some light will be thrown upon the influences bearing upon the architecture of Kashmir during a period about which little is at present known."

Nicholls assumed that the tilework on Madanī's tomb dated from c. 1445 but in his introduction to Nicholls' report, John Hubert Marshall (1876-1958), superintendent of the Archaeological Survey of India, referred to a Persian text at the site indicating that the present entrance was added during Shāh Jahān's reign (1628 to 1658).

Although Nicholls was unaware of the celestial origin of the mural, later researchers (Bandey 1994; Sule et al. 2011) correctly identified it as a representation of the zodiacal constellation Sagittarius which is traditionally depicted as a centaur, a hybrid creature whose upper part is human and whose lower part is equine.

Sule et al. (2011) claim that the dragon-headed tail is such an unusual addition to the figure of Sagittarius in Indian art, that it must depict some extraordinary and temporary feature in the night sky and thus can only refer to the supernova of 1604 and the planets Mars, Jupiter and Sat-



**Fig. 2** The constellation of Sagittarius (as viewed in the sky) in a manuscript of al-Šūfī's *Kitāb šuwar al-kawākib al-thābitah*, copied in Samarkand between 1430 and 1440. Paris, Bibliothèque Nationale de France (ms. Arabe 5036, fol. 162<sup>r</sup>).

urn which happened to be nearby when the new star first appeared in the neighbouring constellation of Ophiuchus.

However, this claim is based on an analysis of early-modern constellation images in which only the astronomical sources were studied while other equally relevant astrological sources were neglected.

### 3 Depictions of Sagittarius in Islamic art

In general, depictions of the zodiacal constellation Sagittarius in Islamic art and manuscripts can be divided into two distinct families: an *astronomical group* closely following the traditional (Hellenistic) constellation imagery and an *astrological group* in which additional features (referring to the astrological nature of the sign) were added to the constellation figure.

#### 3.1 Constellation iconography in Islamic astronomical manuscripts

The *astronomical tradition* in Islamic constellation imagery stems from the *Kitāb šuwar al-kawākib al-thābitah* ("Book

of the Images of the Fixed Stars") of the Persian astronomer Abū al-Ḥusayn 'Abd al-Raḥmān ibn 'Umar al-Šūfī (903–986), who was known in the West as Azophi. This influential uranographical treatise, completed in Shīrāz (Persia) around 964, contains an Arabic edition of the star catalogue of Claudius Ptolemy (books VII & VIII in the *Almagest*) with al-Šūfī's own stellar magnitude estimates and additional information on Arabic star lore drawn from early Islamic sources (Schjellerup 1874; Kunitzsch 1986).

Already in the earliest-known manuscript copies, this work routinely includes two mirrored depictions of each of the 48 Ptolemaic constellations: one as it is seen in the sky ('internal' view) and one as it is seen on a celestial globe ('external' view). As al-Šūfī's star catalogue is a copy of Ptolemy's star catalogue, predated to the epoch 1276 of Alexander [= 1 October 964], the constellation figures closely follow the Greek tradition (Upton 1932/33; Wellesz 1959; Wellesz 1965; Carey 2001) and never add a dragon's head to the centaur's tail (Fig. 2). This is also true for the depiction of Sagittarius on Islamic celestial globes, which in general closely follow the iconography of al-Šūfī's star atlas (Savage-Smith 1985).

#### 3.2 Constellation iconography in Islamic astrological manuscripts

The *astrological tradition* in Islamic constellation imagery is derived from early-medieval Islamic astrology, which was largely based on Hellenistic and late-classical astrological (Bouché-Leclercq 1899; Boll et al. 1931; Neugebauer & van Hoesen 1959; Gundel & Gundel 1966) and also from Late-Babylonian traditions which were still preserved in Harran (ancient Carrhae in southern Anatolia), an ancient site of star worship (Chwolson 1856; Green 1992; Pingree 2002) and place of origin of some of the most skilled translators of scientific works in Baghdad during the Abbasid period.

The most influential author of Islamic astrological lore was the Persian astrologer Abū Ma'shar Ja'far ibn Muḥammad ibn 'Umar al-Balkhī (787–886), who was known in the West as Albumasar. Of his many works on astrology, some of which were also translated in Latin from the late 12th century onwards, the best known are his *Kitāb al-mudkhal al-kabīr ila 'ilm aḥkām al-nujūm* ("Great Introduction to Astrology"), his *Kitāb al-mudkhal al-ṣaḡīr* ("Abbreviation of the Introduction [to Astrology]") and his *Kitāb al-mawālīd* ("Book of Nativities"). Detailed expositions of Islamic astrology can be found in modern editions of Abu Ma'shar's works (Burnett et al. 1994; Lemay 1995/96) or of those of later Islamic astrologers (Ramsey Wright 1934; Burnett et al. 2004).

In order to understand the iconography of Islamic astrological manuscripts it will suffice to list in Table 1 the zodiacal signs and their planetary rulers, their tripartite divisions (the decans) and associated planets (decan rulers) and the locations of the so-called exaltations. In both the sign and the decan rulers it is easy to recognize the traditional planetary order (Saturn, Jupiter, Mars, Sun, Venus,

**Table 1** The zodiacal signs in Islamic astrology

Zodiacal sign	Sign ruler	Decan rulers			Exaltation
		first	second	third	
Aries ( <i>al-Ḥamal</i> )	Mars	Mars	Sun	Venus	Sun (19°)
Taurus ( <i>al-Thawr</i> )	Venus	Mercury	Moon	Saturn	Moon (3°)
Gemini ( <i>al-Tawā'mān</i> )	Mercury	Jupiter	Mars	Sun	Lunar Node (ascending) (3°)
Cancer ( <i>al-Saraṭān</i> )	Moon	Venus	Mercury	Moon	Jupiter (15°)
Leo ( <i>al-Asad</i> )	Sun	Saturn	Jupiter	Mars	
Virgo ( <i>al-'Adhrā'</i> )	Mercury	Sun	Venus	Mercury	Mercury (15°)
Libra ( <i>al-Mīzān</i> )	Venus	Moon	Saturn	Jupiter	Saturn (21°)
Scorpius ( <i>al-'Aqrab</i> )	Mars	Mars	Sun	Venus	
Sagittarius ( <i>al-Rāmī</i> )	Jupiter	Mercury	Moon	Saturn	Lunar Node (descending) (3°)
Capricornus ( <i>al-Jadī</i> )	Saturn	Jupiter	Mars	Sun	Mars (28°)
Aquarius ( <i>Sākib al-Mā'</i> )	Saturn	Venus	Mercury	Moon	
Pisces ( <i>al-Samakātān</i> )	Jupiter	Saturn	Jupiter	Mars	Venus (27°)

Mercury, Moon), based on their assumed distances from the centre of the cosmos (the Earth).

Following an ancient tradition, certain points on the zodiac known as the 'exaltations' (or *hypsomata*) of the planets were of special importance. Already mentioned in Assyrian astrological tablets dating from the 7th century BC as the 'secret houses' (*bīt niṣirti*) of the planets, these were places where a planet was believed to indicate good fortune (Rochberg 1998). Specific longitudes within a sign are already cited in classical texts dating from the 1st century AD<sup>2</sup> and these were also adopted by Islamic astrologers who added values for the lunar nodes.

In Islamic astrological sources the ascending and descending nodes of the lunar orbit were also regarded as planets (Hartner 1938; Hartner 1965; Hartner 1978; Kennedy 1956; Neugebauer 1957; Azarpay & Kilmer 1978) whose exaltations were located in Gemini and Sagittarius. They were known as *ra's al-jawzahar* ("the dragon's head") and *dhanab al-jawzahar* ("the dragon's tail"), from which the European Latin translations *caput draconis* and *cauda draconis* were derived.

Figs. 3 and 4 offer typical examples of how the zodiacal sign of Sagittarius was depicted in Islamic astrological manuscripts. A notable feature of these representations of Sagittarius is the dragon-headed tail and the spotted (or striped) coat of the animal's usually feline (rather than an equine) body, which is found in nearly all known examples. Representations of the diametrically opposite zodiacal sign (Gemini) also usually feature a dragon-like or demonic head.<sup>3</sup>

The planets in these manuscripts also have a very distinctive iconography, which bear little relation to the Greek-Roman representations found in classical art and in early-medieval Greek and Latin manuscripts, but rather seem to

refer to Late-Babylonian descriptions of the planets (Saxl 1912; Ruska 1919; Carboni 1997; but see also Blume 2000, Exkurs 1; Caiozzo 2003). In Islamic astrological texts both the Moon (*al-Qamar*) and the Sun (*al-Shams*) are always recognizable by their circular faces, Mercury (*al-'Uṣṭarid*) is usually depicted as a seated scribe, Venus (*al-Zuhara*) always plays a musical instrument (lute or harp), Mars (*al-Mirrīkh*) usually wields a sword and carries a decapitated head, Jupiter (*al-Mushtarī*) is often depicted as a person in contemplation (or observing with an astrolabe) while Saturn (*al-Zuḥal*) is usually dark-skinned and carrying an axe.

Abū Ma'shar's zodiacal and planetary figures were also frequently copied in later astrological and cosmographical works such as the *Kitāb 'ajā'ib al-makhlūqāt wa gharā'ib al-mawjūdāt* ("Book of the Wonders of Creation and the Rarities of the World") by Abū Yaḥyā Zakariyyā ibn Muḥammad ibn Maḥmūd al-Qazwīnī (1203-1283), a Persian imam, jurist and cosmographer (Ethé 1868). This work gave a description of the cosmos, the earth and its inhabitants which, judging from the large number of manuscript copies that are still extant, enjoyed great popularity in the Islamic world (Carboni 1992; Caiozzo 2003). Figs. 5 & 6 give some typical examples.

## 4 Conclusion

From the above-discussed depictions of Sagittarius in Islamic astrology, it is evident that the Sagittarius mural at Srinagar is derived from an Islamic astrological source and therefore cannot be used as evidence for an Indian sighting of SN1604.

Although the completeness with which Far-Eastern astronomers recorded various transient celestial phenomena (eclipses, comets, new stars, meteors, sunspots and aurores) is unrivaled, Islamic astronomers and historians also made numerous observations of unusual celestial events. So we have fairly comprehensive records of lunar and solar eclipses (Ginzel 1887; Said et al. 1989; Stephenson & Said 1989; Stephenson & Said 1991ab; Said & Stephenson

<sup>2</sup> Pliny the Elder, *Naturalis historiae* II 13 [65].

<sup>3</sup> Other peculiarities in the depiction of the zodiacal constellations often found in Islamic astrological manuscripts include: Virgo depicted as a young man sitting in a wheat field, Libra upheld by a young woman, Scorpius as two scorpions encircling each other and Aquarius as a man drawing water from a well.





**Fig. 3** The zodiacal sign Sagittarius in the *Kitāb al-bulhān* ("Book of Wonders"), an Islamic divinatory compendium dated to the late 14th or early 15th century, with its sign ruler Jupiter. Below (from right to left) are the decan rulers Mercury, the Moon and Saturn. Oxford, Bodleian Library (ms. Or. 133, fol. 17<sup>v</sup>).

1996; Said & Stephenson 1997; Stephenson & Said 1997), comets and meteors (Modi 1910ab; Khan 1946; Khan 1948; Kennedy 1956; Rada & Stephenson 1992; Kidger 1993; Hasegawa 1996; Cook 1999; Rada 1999/2000) and sunspots (Vaquero & Gallego 2002ab).

However, Islamic records of 'new stars' are indeed rare and are limited to reports of the outbursts of SN1006 (Goldstein 1965; Porter 1974) and SN1054 (Brecher et al. 1978).

In general, Hindu astronomers do not appear to have been greatly interested in uranography (Kaye 1924). The Persian polymath Abū'l-Rayhān Muḥammad ibn Aḥmad al-Bīrūnī (973-1048), who visited the western and central regions of India in the 1030s and admired Hindu astronomers for their knowledge of the planetary motions, nevertheless noted in his *Kitāb fī taḥrīr mā li'l-Hind min maqāla maqbūla fī'l-'aql aw mardhūla* ("The Book Containing Explanation of Doctrines of Indians, Both Acceptable by Reason or Rejectable"):



**Fig. 4** The third decan of the zodiacal sign Sagittarius in a manuscript (dated AH 700 [1300/01 CE]) of Abū Ma'shar's *Kitāb al-mawālīd* ("Book of Nativities"). Jupiter, the ruler of the sign, is seated at the right and Saturn, the decan ruler, stands at the left. Depicted below (from right to left) are the Moon, Mercury, the Sun, Mars and Jupiter, a sub-set of the planetary 'terms' (*ḥudūd*) for this decan attributed to Aṣṭarāṭūs (Erasistratos). The coloured circles denote individual degrees in this decan, the significance of which is not well understood. Paris, Bibliothèque Nationale de France (ms. Arabe 2583, fol. 27<sup>v</sup>).

"The Hindus are very little informed regarding the fixed stars. I never came across any one of them who knew the single stars of the lunar stations from eyesight, and was able to point them out to me with his fingers." (Sachau 1888, vol. 2, 83)

It is also significant that the *Akbarnāma*, the voluminous official history of the reign of the third Mughal emperor Akbar the Great (reigned 1556-1605), mentions the great comet of 1577 in detail (Beveridge 1907/39, vol. 3, 311), and some earlier comets in AH 662 (1263/64 CE), AH 803 (1400/01 CE) and AH 837 (1433/34 CE) (*ibid.*, vol. 3, 314), but is silent on the new stars of 1572 and 1604, the latter occurring just a year before the emperor's death.

**Acknowledgements.** I am grateful to prof. dr. Aijaz Bandey (Centre for Central Asian Studies, University of Kashmir, Srinagar) for providing me with documents and recent information on the





**Fig. 5** The zodiacal signs Taurus and Gemini in a Persian manuscript (dated AH 1010 [1601/02 CE]) of al-Qazwīnī's *Kitāb 'ajāib al-makhlūqāt*. Leiden, University Library (ms. Or. 8907, fol. 21<sup>r</sup>).



**Fig. 6** The zodiacal signs Libra, Scorpius and Sagittarius in a Persian manuscript of al-Qazwīnī's *Kitāb 'ajāib al-makhlūqāt*. Leiden, University Library (ms. Or. 8907, fol. 22<sup>r</sup>).

Sagittarius mural at Srinagar. I am also grateful to prof. dr. Jan Hogendijk (Department of Mathematics, Utrecht University) for comments and corrections to the draft version and to the referee for critically reading the manuscript.

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